Tax Accounting: A History of Technological Change

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by

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Abstract

Accounting and the related tax accounting field have been essential to conducting business and generating income so governments and corporations around the world can operate and provide for their citizens. Over the last fifty years, technology has become an integral part of this field, and therefore, a certified public accountant (CPA)'s daily tasks. For my study, I researched the major technology developments in the accounting industry in hopes of understanding the experiences associated with changes in the way accountants completed their work. I felt as though my accounting education at Ball State has not included enough of an historical perspective on the changes in accounting technology, something that I have been interested in studying since electing accounting as my major. My research has filled that gap in my overall accounting education.

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Over the last fifty years, tax accounting technology has changed so drastically that now, anyone with limited accounting knowledge can accurately complete their own personal tax returns digitally. In addition, the use of technology has created networks of data sharing and allowed extensive amounts of information to be used in business applications. Firms "want their clients to have the information immediately" and software applications like email and cloud computing are allowing them to do so with ease (Landaker). From initial mechanized calculators to electronic data processing and now collaborative services, the development of tax technologies has been a long and sometimes unproductive process. However, effectively and efficiently using new technology has allowed the extremely competitive Big Four accounting firms (Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers) to grow at an average of 2.8% annually since 2009. To date, $94B in revenue for the tax accounting services industry in the U.S. can be attributed to the use and continued evolution of accounting technology throughout the last 50 years (IBIS).

Processes for tax accounting have not always been efficient and effective; before the widespread use of technology, tax accounting was labor intensive. According to Paul W. Parkison, CPA and former Ball State Accounting Department Chair, technology changes have "all been good," allowing more efficient problem solving and the elimination of "mechanical chores" from the entire workflow process. Jim Landaker, of Landaker & Associates, a small accounting firm in Columbus, Ohio stresses the importance of current technologies' ability to "keep accurate accounting records on a daily basis – making more information available to set goals and track them every day." The use of the current technologies allows accountants to produce more information that they, in turn, give to decision makers within firms. These decision

makers are ideally better equipped to make good business decisions for the firm, thus driving business around the world.

Dr. Paul Parkison attributes much of the initial technological change in mechanical accounting systems to the United States' "Race to Space" in the late 1950s and early 1960s and the invention of the transistor for radio and mechanized applications. Before this time, primitive 10-key adding machines were used and automated work processes were non-existent. Accountants would complete tax returns by hand and then students were hired by firms to run "computation checks" where they would check all of the arithmetic on the return before it was sent off for copying and eventual submission. Firm partners would even check the math calculations entirely in their heads, footing and cross-footing their large tables with no mechanical assistance. Overall, CPAs were not resistant to change; they saw that even the most primitive of technologies could help improve efficiency (Parkison).

As the U.S. government spent money developing the space program, tremendous technological advances, such as the development of mechanized counting machines, mainframe computers, vacuum tubes, and transistors, became the product of the widespread push for innovation. At this time, prices of these technologies were so expensive that only large industries like the banking and accounting industries were able to be earlier movers on technology applications.

One of the first computers, the Sperry UniVac Computer successfully predicted the 1952 election with Dwight D. Eisenhower winning the presidency. The UniVac was developed using vacuum tube technology, with the first UniVac computer being delivered to the U.S. Census Bureau on Mach 31, 1951 (Bellis). The inventors of the UniVac computing system, John Presper Eckert and John Mauchly, received a budget of $400K for their first machine. The UniVac I had

extensive computing capabilities for the time period, and their only competitor was IBM, whose "punch card" system could not input data as quickly as did the magnetic tape system designed by Eckert and Mauchly. The Sperry UniVac was able to complete simple addition, multiplication and division computations in microseconds, allowing large projects like the 1952 election prediction and proposed census calculations to be completed in a timely manner. After the UniVac's successful prediction of the 1952 election, the public began to accept computers as effective, efficient, and time-saving, making the UniVac "a household name" (Bellis).

These large, expensive machines were then sold to the next highest bidder. After the public sector, the banking industry was the next to adopt similar technologies. Paul Parkinson recalls seeing a mainframe computer at bank in Indianapolis in the late 1950s. He described the machine as "huge... hot ... and less powerful than a modern computer." The entire room where it was housed, with specialized air conditioning, was designed and used only for the mainframe computer, which illustrates the tremendous spatial requirements of early technology. In addition to the cost of the actual computing hardware, specialized system analysts were required to service and educate operators on the technical aspects of the machines. Because of this, smaller firms, and even entire industries could not adopt the early computing technologies because of the expenses associated with the hardware and maintenance.

It was not until nearly a decade later when accounting professionals and tax preparers were able to access the technology and improve their accounting and compliance efficiencies. In 1968, two major tax-processing systems were created to complete returns for clients from central data processing centers. AutoTax and CompuTax were able to process and complete returns for an average cost of $15.00 (Practical Accountant 1:4). Prior to 1968, other computing companies tried to successfully use computer systems to complete compliance work but many failed.

Companies like "Systems and Taxes went into bankruptcy" and "DataTax...decided to sit the year out" after extensive operating losses. Companies like AutoTax and CompuTax operated under tremendous economic pressure before the 1968 tax season; an editorial in the first volume of The Practical Accountant, written in 1968, provides insight into the early computer processing environment:

> "The year 1968 promises to be the critical one for the industry. The service companies [AutoTax and CompuTax] hope to make a profit (or at least breakeven) in 1968. They also hope that all of the early problems will be resolved. If these two ends are accomplished the industry will undoubtedly begin to move ahead on a much broader and aggressive scale than it has in the past. If not, there will undoubtedly be further shakeout and further changes in ownership" (Practical Accountant 1:4).

AutoTax and CompuTax were desperately attempting to accurately process returns to not only make money for their firm but to continue innovating in the data processing industry. This competitiveness is realized in the competitive pricing that each firm implemented for the 1968 tax season as well as a guarantee to re-process returns, for an additional fee, that were incorrectly computed (Practical Accountant 1:4).

In the years before 1968, AutoTax and CompuTax faced two major problems in completing returns: accuracy and processing time. For the 1968 tax season, AutoTax and CompuTax promised to deliver returns between five and ten days and even built in reduced costs for processing errors. According to an editorial survey in the first volume of The Practical Accountant, of all the computer-completed returns in 1967, 4.5% of them included errors. Many of these errors were attributed to the computer's inability to "think for itself" (Practical

Accountant 1:7). Until this time, data processing was in the hands of specialists and large corporations. Accountants shipped the information off to the data processing center and waited for their return to be processed with no guarantee that it would be accurate. Michael L. Hughes and John O. Quingley, Washington D.C.-based accountants and computer installation specials wrote in a 1968 Practical Accountant column that, "at the present time Electronic Data Processing may provide little or no dollar advantage over manual recordkeeping methods...[but] the computer can smooth the peaks and troughs of cyclical accounting chores" (Practical Accountant 2: 50). This is exactly what Dr. Paul Parkinson attributed to accountants adopting early data processing technologies, to eliminate repetitive "chores" from the workflow process. Because most of the systems could not complete actual computations, many accountants were hesitant to adopt the technology for simple returns. At this time, it was still more time efficient and cost effective to complete the returns manually. If the computing costs could not be "passed to the client," accountants would circumvent the entire process and continue with manual tax preparation. This would not only save on the cost of completing the simple return, but also save processing and work time. Therefore, clients became the driving force for technology implementation by accounting firms (Practical Accountant 1:5). Clients with large volumes of transactions required significant data processing, ideal for the use of data processing systems, whereas smaller jobs did not require expensive processing. Although accuracy and processing time issues arose in 1968, 70% to 90% of surveyed accountants who used the technology noted that they would continue computer system implementation into the future (Practical Accountant 1:8). Once CPAs and tax professionals were convinced that the technology available was accurate and efficient they became accustomed to electronic data processing systems.

Service providers then looked to differentiate their product for further efficiency in long-term applications. Providers like CompuTax offered pro forma tax input documents that would include prior years' data and "itemized deductions, depreciation schedules, and income averaging data" (Practical Accountant 1:6). This would save accountants time in completing future compliance returns, something that they were fond of at the time. The only issue with receiving prior year forms and pro forma input forms was that some systems printed them on ThermoFax paper. The master copies printed on this type of thermal imaging paper were unreliable due to the volatility of the material. Dr. Paul Parkinson recalled filling out a ThermoFax paper for a prior year return and then viewing the return at a later date. The paper was illegible; in some cases the ThermoFax content had completely disappeared.

These issues created a need for the use of another type of technology: copying machines. However, copying machines were still very primitive as discussed in the 1968 Practical Accountant article entitled Copying Machines (54). The argument for adopting copying technologies also evolved around the repetitive processes of completing similar client returns year after year. Most clients did not have drastic changes to their financials from year to year, so the ability to store the previous year's work papers and tax documents had a tremendous impact on proficiency.

The article also outlined eight reproduction processes used by various copying machines. These processes include Diazo, a process that involved "diazonium salt" to "make corrections with a soft pencil... a fast, one-step, inexpensive process" (Practical Accountant 53). One of the other processes outlined, that we are now more familiar with, was "photocopy reproduction" (Practical Accountant 53). The article stated that the process was similar to developing camera film: "a slow, wet method. Problems often [arose] due to over- or under-exposure and weak

developer solutions. Costs [were] also high." The photocopying process, which has evolved drastically since 1968, is now accepted as a best practice for reproducing documents, work papers and tax returns.

In 1971, after the widespread success of accounting processing systems, new services like Fast Tax became popular in the computer tax field. They had the ability to complete tax returns for individuals, corporations, and partnerships as well as compiling fiduciary reports over the course of the year (Fast Tax). Computer Language Research, Inc. was the corporation behind the development and implementation of the Fast Tax services. They initially offered semi-computerized tax services where all computations would require completion by accounting professionals; this data would then be inputted on a form, sent to Fast Tax's central processing center and then inputted into a computer with the end product being a completed return. Fast Tax would then mail the completed return back to the tax professional for the re-computation of account totals, verification of information and then delivery of the product to their client. Unlike the processes used in 1968, Fast Tax's process in 1971 claimed to offer "8 to 16 hour priority service" on request. However, this increase in processing time was still inhibited by the use of snail mail.

Other companies like Fast Tax continued to grow exponentially. The Practical Accountant's Tax-Season '71 Roundup cited 14 companies that were offering electronic data processing services. Firms had to choose not only whether or not they would outsource their compliance returns for processing, but also which company would have the proper processing requirements for their clients' applications. Price-per-returns dropped to as low as $2.50 for minimum computations and printing to $25.00 for extensive "checking and auditing" (Practical Accountant 6: 51). Unfortunately though, "the mortality rate in the industry [was] very high—

four companies listed in [the previous] year's survey [were] no longer in business," meaning that CPAs had to be careful about outsourcing their clients' information. CPAs had to search each year for the most reliable vendors for processing services.

In 1971, purchasing, maintaining and operating large data processing computers was not feasible for small accounting firms. Additionally, individual returns were still considered too simple and too costly to warrant complex data processing services. This all changed when large banks and Fortune 500 companies started offering individual tax computing and preparation services. These new tax preparers, including Macy's, Sears, and H & R Bloch, "realized that the real money was in bulk preparation of simple returns—a task for which a computer is innately qualified." At the time, these large firms with extensive computing capabilities determined that the untapped market of "73 million individual returns...filed each year" would be a great source of revenue (Practical Accountant '71: 42). This would mark the first time that computer processing for tax returns would be readily available to individual customers.

From 1971 to 1977, companies like ADS Systems developed intelligent accounting information systems like their MAC application. The primitive information system could be used directly by bookkeepers and accountants to track financial information on a day-to-day basis. This system would run on a Burroughs Mini-Computer that computed pre-determined schedules for ease of use by accountants. However, automated computers had significant costs for firms and did not eliminate the need for data entry. They were used more as a source for organizing information and then reproducing it accurately and in a legible form. Built-in applications included accounts payable, payroll, job costing and general ledger schedules (ADS).

At this time, the popularity of personal calculators also increased with Hewlett Packard offering multi-function, printing calculators for $750 per unit (Hewlett Packard). This illustrates

that simple information systems and computational hardware were becoming available to the everyday accountant at steep prices. Larger firms and companies could more readily afford the technology so the integration of technology into the accounting world started to rapidly increase.

In the next couple of years, companies continued to develop mini-computers for use at large and small firms. Data processing systems like CCH CompuTax continued to dominate the tax-processing world. New companies like Lacerte Microcomputer Corporation developed their own client, tax processing minicomputer and software for specific application in the tax accounting field. In 1980, they released an advertisement in The Practical Accountant that illustrated the vast size of their "micro-computer." Nearly the size of a large desk, the system claimed to "reduce input time by 50%" as well as to have the ability to "print corrected reports in less than 15 minutes." The system allowed the operator to make changes to the data before printing it on the pin-feed printer included with the machine. They also emphasized the ability to maintain complete confidentiality with their computer and operating system. CPAs could rest easy knowing that they did not need to send their returns across the country to a data processing center. They could purchase and operate their own data processing center, for around $10K, in their own office, a truly monumental leap in tax accounting technology (Lacerte).

As computers evolved and became smaller, the first "luggable" computers, similar to the Lacerte Microcomputer became available to firms and accountants. As CPA Jim Landaker explains, these first computers were "the size of a large desk" and some CPAs would use them as "door stops" (Landaker). These primitive machines, which ran on 5.25-inch floppy disks, were tedious to use, and their storage capacity was minimal. In some cases, a file or program would be so large that CPAs would need to load and save their work on multiple disks. If the CPA

erroneously loaded their disks or forget to save their work they would need to completely start over (Landaker).

At this time, CPAs like Dr. John Ledbetter were still completing input forms, shipping them off to a data processing center and then waiting to receive a completed return from the data center. Obviously, this was not nearly as efficient as being able to complete a return in the office, but CPAs did not need to have any computer skills nor know how the processing technology worked (Ledbetter). However, once mini-computers were brought directly to the accountants, they had to become accustomed to new, strange technologies. There was a steep learning curve, and the process of learning the technology was very much based on trial and error experiments. Despite this initial burden of learning new technology, implementing technology into everyday work was essential for accountants who wanted to increase productivity and quality of the work.

Many CPAs struggled with the use of these primitive computers, and many of these computers would crash without warning. In the mid-1980s, CPA Dan Gifford received an Apple Plus computer. At this time, computers required a software application to be loaded on its hardware every time the machine was turned on. Once the "boot" drive was completed, the CPA would then load the spreadsheet that they were working on. The "boot" drive consisted of the program that would run the file for data manipulation (Gifford). Early word processing programs like "Word Perfect" and "Lotus 1-2-3" became the foundation for developments like Excel and Microsoft Word.

Because of the temperament of the hardware that they were working with, CPAs like Dr. John Ledbetter and Dan Gifford made sure to learn from their mistakes. If they forgot to save a file once, and all of their work was lost, they were sure to not make the same mistake again. Dan Gifford recalled loading a file in the incorrect order and losing all of the data that he was

attempting to manipulate. Dan noted that, "patience was key:" the software was so tedious that it was easy to get upset when working with the system; however, accountants knew that the product of their work completed on the computer would be far superior to the manual work they would complete.

Dan Gifford was excited for the use of the new technology saying that the technology was a "necessary step to address a deficiency in my own product." This deficiency was messy handwriting. His ability to digitize his work and produce a readable, consistent spreadsheet was helpful for his career development and with communicating his work to his peers and superiors. Dan "could hear the change coming, so let's embrace it;" he looked forward to the challenge of adapting to the technology and remaining "fluid" as programs, hardware, and clients' needs changed.

Data processing programs like Lotus 1-2-3 "set the standards for productivity applications for personal computers for a long time" and brought data processing, a previously complex idea, to the accounting industry (Kapor qtd. in Barker). Released in 1983, Lotus 1-2-3 was expected to pass $1M in sales in its first year, but instead, the breakthrough software accounted for $54M in sales (Barker). Inventor Mitch Kapor designed the software to work on IBM's brand new PC that was introduced to the market in 1981. Previously, the only other data processing application was VisiCalc, an Apple based application that was not nearly as complex or extensive as Lotus 1-2-3. Because of the universal application of the Lotus 1-2-3 software, IBM offered support for the very first version until September 30, 2014, 31 years after the initial release of the product (Barker).

As software applications continued to progress, computers took the next step in mobility. In 1991, Dan Gifford received his first mobile PC. The Macintosh PowerBook 100 was released

with incredible computing capabilities for the time period. The $3K machine had a built-in 20 or 30 megabyte (MB) hard drive with a 3.5-inch floppy drive for saving files and transferring them to another accountant's computer. Its predecessor, the Macintosh Portable, released in 1989, weighed around 15 pounds, while this updated version weighed just over 5 pounds (Old Computers). Dan Gifford stated that working with the PowerBook was "like heaven." The machines were portable, relatively easy to use, and applications like Lotus 1-2-3 ran smoothly on them. Still, issues with storage, saving work and computer crashes prevailed. Dan recalls receiving a "bomb" error screen after attempting to re-open a file that he had been working on. The technology was not perfected yet, but the rate at which it was developing was staggering.

During this same time period, the Internet, local area networks (LAN) and wide area networks were gaining popularity in the accounting world. Until the inception of these resources, accountants had to work independently on a project, manually save their data to a floppy disk and then handing it to another accountant for continued manipulation. In 1991, Tim Berners-Lee, a web developer working in Geneva, Switzerland conceived of and developed the World Wide Web (Moschovitis 163). Berners-Lee developed the application using "three basic architectural principals." The first, the Universal Document Identifier, created addresses for each "page" on the Internet that could be found using search tools. The Universal Document Identifier later became known as Universal Resource Locators or URL, which is the term used to refer to the "address" where a document or resource can be found. The second architectural principal, Hypertext Transfer Protocol or HTTP was developed as "the protocol for accessing data and traversing hypertext links." Hypertext is data that includes actual text characters, as well as digital media data that can be stored and searched for on the World Wide Web (Moschovitis 164).

The final architectural feature of the World Wide Web was the implementation of Hypertext Markup Language, a coding language that allowed operators to write hypertext in order to create applications or searchable data to be used with the World Wide Web. Moschovitis explained that "From 1991 to 1994 the use of the original WWW server (info.cern.ch) [grew] by a factor of ten each year as the world [began] to take note of a new information phenomenon," allowing the internet industry to explode with new developments including programs and software applications coming to fruition (164).

As we saw with the early data processing systems, the government was the first to integrate the new Internet technologies in their various sectors. In 1993, the United Nations and the White House created web pages to present information to the public (Moschovitis 177). It would only be a matter of time before corporations not only created web pages for the public to discover information about their firms, but also developed internet-based resources for accountants.

The Internet allowed for complete connectivity not only between accountants and online resources, but also between accountants and their team members. Work could now be completed and then sent electronically to another accountant for further analysis. With the development of the Internet came applications that utilized HTML coding to allow machines to communicate. Groupware, or "applications that enhance communication, collaboration, and coordination" among co-workers, were developed using Internet connectivity. The creators of Lotus 1-2-3 developed an application to electronically send messages from one computer to another using a local area network. Groups or firms could establish "a dedicated server machine that communicated with other groups' server machines. Servers exchanged information through replicated data... [which] made it just as easy for users to exchange information with co-workers

in a branch office as with those in their own office" (IBM 3). Lotus Notes 1.0 was released in 1989 with 35,000 copies being sold in the U.S. The next release, 2.0, was then scaled for larger companies with total packages starting at $62K. This would give firms the ability to link 200 computers together in Lotus Notes, allowing for nearly seamless communication from worker to worker (IBM 5-8).

In the early 1990s, Apple's PowerBook was used in business applications with the ability to run both Lotus 1-2-3 and Lotus Notes. However, in 1995, IBM's decision to purchase Lotus greatly impacted personal computer trends. IBM developed Lotus Notes for PCs and scalable operations like Fortune 500 companies. IBM spent two years developing the product and, "sold it to entire corporations instead of just departments" (IBM 9). Because IBM was also producing hardware, they were able to effectively package their hardware and the Lotus software creating value for firms around the world. Dan Gifford recalls the gradual move from Apple to IBM computers: "Macs were effective for graphics and image manipulation, Windows went to business and everyone followed." Windows 95 became the preferred business operating system, Lotus 1-2-3 was replaced by Excel and eventually, and Microsoft's Outlook replaced Lotus Notes (Gifford).

Firms continued to develop software applications to help accountants complete their work or make difficult calculations to generate specific calculations. The July 1997 addition of Accounting Technology reviewed 13 software applications that were designed to run on computers like the PowerBook 100. The applications were designed to help automate recurring journal entries for accountants. Common recurring entries at the time and still today, included processes like payroll, profit and loss calculations, human resource management, and inventory control programs (Accounting Technology). Accountants around the world could purchase these

applications and develop schedules, working papers and supporting documentation with ease. They could manipulate and edit data directly on their portable machines and then save files, transfer them to co-workers, or print completed reports to be filed or considered in tax return compliance.

Many of the companies that developed early accounting programs did not survive the transition into the 2000s. However, large firms like Intuit Inc. continued to produce applications that the public generally accepted as being the simplest personal accounting software on the market. Intuit had one goal with their first personal finance software, Quicken, released in 1983: "balancing the family checkbook," a previously manual task that all families completed on a monthly basis. Intuit realized that simple data processing techniques could be applied to a simple accounting information system and scaled to fit a family. They did not need to release products for large companies, much like the Macy's and H & R Bloch of the 1970s; they wanted to develop processing systems for the average American, "inventing new solutions to solve important problems" (Intuit).

Intuit has now become the most popular personal and small business accounting software producer. Their products like QuickBooks and TurboTax have widespread popularity among businesses and individual users all over the world with more than 50 million people using their software (Intuit). TurboTax, which has been in service for the last 20 years, walks consumers through the process of data entry and the completion of a return. The digital application was designed for the average taxpayer to use the software and accurately comply with State and Federal Tax regulations. In a 1997 Consumer Report, surveyors agreed that using TurboTax was "easier and less time-consuming than preparing their returns by hand," with a minority of those surveyed agreeing that the software had no benefit. Unfortunately, in this report, 54 returns were

competed using TurboTax, Kiplinger Tax Cut and Personal Tax Edge, but only three had contained completely accurate computations (Consumer Report). The primitive software may have been easier to use and less time-consuming, but the results were unsatisfactory.

At this time, it was still very important that users of primitive personal tax accounting software had some idea as to the computations that they were completing. Simple misstatements and erroneous data input could cause the user to pay fines based on an overstatement or understatement of their taxable income. The Consumer Report authors offered three tips for completing an accurate tax return: "[check] your work carefully... compare your return against the one you filed last year... be sure your computer is up to the task" (Consumer Reports). To help increase the accuracy of their program, Intuit built tax references right into the program allowing the person completing the return to use the application as a reference to solve complicated tax problems. This led to TurboTax receiving the highest consumer rating of the three programs tested. In more recent years, TurboTax had added Internet connectivity to allow even more built-in resources to their program.

Corporate accounting took a similar, larger scale approach to the idea of combining tax resource technology with an application to complete returns. Thompson Reuters, an information and software development company created OneSource, a tax compliance application for firms of all sizes. Big Four firms like Ernst & Young are currently using their software to complete returns. Thompson Reuters states that OneSource "is the most widely-recognized corporate tax solution on the market." It is completely interfaced with Federal and State tax regulations for a seamless completion of income tax calculations. Although the software is complicated, Thompson Reuters has built-in resources to aid accountants with the completion of tax returns:

the company offers training as well as a checklist built directly into their software to ensure that all applicable forms and schedules have been prepared before the return is filed.

Accountants, using database management tools like Excel or Microsoft Access, directly import trial balances to OneSource and then complete returns digitally, print the returns and then review the computations made. The entire process is performed electronically and the completed file can be emailed to a co-worker or superior for additional work or review. Staff accountants like Dr. Kelsey Brasel, formerly working at Ernst & Young, LLP, performed large "data dumps" and significant calculations prior to inputting the data into OneSource. Manipulating the data and formatting it properly before inputting into the accounting system was a labor-intensive task, and before 2009, all data entry was still manual with accountants reviewing receipts and supporting documents to assemble figures used for tax compliance.

In 2009, new software, in conjunction with network-based faxes and scanners, attempted to eliminate data entry processes altogether. The technology, as explained by Dave Wyle, is known as optical character recognition or OCR. The technology is designed to create a paperless tax workflow by "scanning taxpayer source documents at the beginning of the tax preparation process" (Wyle). Source documents are scanned and OCR technologies pull data directly from handwritten or typed documents eliminating data entry in some cases. This also allows instant digitization of files that can then be stored on a cloud-based server, accessible from anywhere in the world. According to David Goldman, CNN technology editor, "the cloud, simply, refers to software and services that run on the Internet instead of your computer."

Tyler Schleich, CPA and Business Development Director at Ernst & Young, noted that this technology allows clients to participate in the tax preparation process. Clients can eFax documents to CPAs or directly to a cloud file that will hold all of their supporting documents

until it is time for the tax return to be prepared. Tyler referred to the inclusion of clients in the tax return process and the technologies developed to do so as "client-facing" applications. This not only saves organizations time, but also physical space: fewer large rooms are dedicated to filing systems as records are being electronically scanned to the cloud.

Jim Landaker explained that this cuts office costs as well as administrative costs of filing papers and keeping accurate, manual records. Digitally filed records are safe from natural disasters or accidents that could wipe out all of a client's work papers. However, it does pose a significant threat that is omniscient in the digital age: security. Firms have developed or purchased security protocol tools to digitally protect their clients' information. Ernst & Young uses a Thompson Reuters data encryption security system with passwords that are encrypted on a time schedule (Brasel), while smaller firms like Landaker & Associates rely on password-protected applications that only allow accountants and authorized workers to access the information. In addition, copies of the work files are backed up daily to a hard drive, a USB drive and a cloud-based server for maximum security and protection from unexpected events (Landaker).

In my personal experience, working as an intern for Ernst & Young, my entire work day was consumed with the use of accounting technology. From developing work papers, completing accounting schedules for various calculations to producing tax returns, the entire workflow process involved some degree of digital automation. I have never completed a manual tax return for a client, and I believe that the future of tax accounting will remain entirely digital, supporting my experiences. The Internal Revenue Service (IRS) has begun to implement electronic filing requirements for firms and individuals who intend to prepare more than 11 returns in a calendar

year. The requirement, which has been in place since January 1, 2012 is another indication that, eventually, all tax preparation and filling, will be completed electronically.

Over the last 50 years, the Internal Revenue Service (IRS) has issued various standards and requirements that changed the way accountants compute values and complete their work. The Internal Revenue Code requires calculations to be completed a certain way or financial instruments to be classified differently; the IRS and the revenue code that they change influence the actual work that accountants complete on a day-to-day basis. However, accountants owe a lot of gratitude to innovators like John Presper Eckert and Tim Berners-Lee for products that have changed the way that accountants complete the work they are required to do. Original data processing systems eliminated double-checking computations on tax returns, while more recently, Internet connectivity has made accounting firms collaborative and global entities. Accountants complete more work, in less time, using computers and programs like Excel. They can communicate more efficiently and effectively with clients using electronic mail technology or client-facing programs. Additionally, accountants can now digitize client's receipts and work papers automatically. These examples are proof that technological changes have permitted accountants to more accurately provide information to decision makers and tax agencies, thus improving business around the world.

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"Tax Accounting: A History of Technological Change." Personal interview. Dr. Kelsey Brasel, CPA. 11 Nov. 2014

"Tax Accounting: A History of Technological Change." Personal interview. Jim Landaker, CPA. 19 Nov. 2014

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Parkison, CPA. 20 Nov. 2014

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Questions For Accounting Interview:

1. Please briefly describe your accounting experience
    a. Year started?
    b. Are you a registered CPA? When did you obtain certification?
    c. Years of experience
2. What was your first experience with technology in the Tax Accounting Field?
    a. What software/hardware was used?
    b. What work was being completed?
    c. Context of the situation (Year/Client/Job)
3. Can you remember conversations about first using the technology?
    a. Other professional viewpoints shared by you or your peers?
    b. Can you remember who was pushing for a switch to early tax accounting technologies?
    c. Was your peers/yourself satisfied with the use of the technology?
4. Pertaining to your first experiences with technology, where you or other CPA's hesitant to use the technology?
    a. Were you forced by a superior/vendor/client to use the technology?
    b. Forced by some other obstacle (specific processing requirements, scale)?
5. Please explain, in chronological order, your memorable experiences with technology and tax accounting.
    a. First experiences with Excel and other data processing software?
    b. Other early programs like excel?
    c. Early computers?
6. How long and difficult was the process of integrating early technology into work processes?
    a. Major risks involved in technology integration?
    b. Auditing software procedures?
7. Briefly explain your first experiences with Internet resources, Intranet connectivity in the workplace.
    a. Context of the situation (Employer, Client, Year, Work Completed)
    b. Initial Accounting Information Systems (Year, Memorable Software)
8. Please explain the role of technology in current Tax Accounting practice, or your most recent technology experiences.
    a. Impact of the Sarbanes-Oxley Act (2002)

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11/18/14
Date

Signature

Kelsey Brasel
Printed Name

Contact for Follow-up Research and Non-research Related Media Uses

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Kelsey Brazil
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11/19/14
Date

James A. Landaker
Signature

JAMES A. LANDAKER
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11-20-17
Date

Paul W. Parkison
Signature

PAUL W. PARKISON
Printed Name

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Paul W. Parkison
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PAUL W. PARKISON
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11/24/2014
Date

Signature

JOHN H LEIBBER
Printed Name

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Signature

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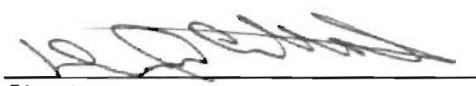
11/10/14
Date


Signature

Daniel C. Gifford
Printed Name

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David C. Gifford
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12.11.14
Date

Tyler D. Schleich
Signature

Tyler D. Schleich
Printed Name

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